**Create Publisher and Subscriber Nodes in ROS and OpenCV for Sending and Receiving Camera Images**

**1. Install the necessary software components and check that camera can be read by Linux**

- First, connect your camera to USB port. Then run Cheese. Cheese is a image recording capturing software that comes with Ubuntu.

Then, double check if the drivers exist. Open a Terminal and type

Is /dev/|grep video

If you see an output: video0

Then, install the ROS webcam driver called usb\_cam. We do that by using the following command

sudo apt install ros-noetic-usb-cam

-ROS should come with an OpenCV installation. However, we can also manually install OpenCV and other tools for perception as follows:

sudo apt install ros-noetic-perception

**2. Check the .bashrc file in order to make sure that the ROS environment is sourced**

gedit.bashrc

At the end we should have:

source/opt/ros/noetic/setup.bash

If not, then add this line.

3. Create a workspace

mkdir -p ~/ros\_open\_cv\_ws/src

cd ~/ros\_open\_cv\_WS

catkin\_make

source~/ros\_open\_cv\_ws/devel/setup.bash

echo $ROS\_PACKAGE\_PATH

**4. Create a Catkin Package and Nodes**

cd ~/ros\_open\_cv\_ws/src

catkin\_create\_pkg ros\_opencv image\_transport cv\_bridge sensor\_msgs rospy roscpp std\_msgs

cd ~/ros\_open\_cv\_ws/src/ros\_opencv/

mkdir python\_script

cd python script/

gedit camera publisher.py

chmod +x camera\_publisher.py

gedit camera subscriber.py

chmod +x camera\_subscriber.py

gedit camera\_subscriber.py

chmod +x camera\_subscriber.py

THEN, EDIT CmakeLists.txt file

cd ~/ros\_open\_cv\_ws/src/ros\_opencv/

gedit CMakeLists.txt

CHANGE THIS

## Mark executable scripts (Python etc.) for installation ## in contrast to setup.py, you can choose the destination #catkin\_install\_python (PROGRAMS

# scripts/my\_python\_script

# DESTINATION ${CATKIN\_PACKAGE\_BIN\_DESTINATION}

#)

TO:

catkin\_install\_python (PROGRAMS python\_script/camera\_publisher.py

python\_script/camera\_subscriber.py

DESTINATION ${CATKIN\_PACKAGE\_BIN\_DESTINATION}

)

cd ~/ros\_open\_cv\_ws/

catkin\_make

cd ~/ros\_open\_cv\_ws/

catkin\_make

**5. Test everything**

Close all the terminal windows

Open 3 terminals

Close all the terminal windows

Open 3 terminals

In the first terminal, type:

roscore

In the second terminal, start the publisher node:

source/ros\_open\_cv\_ws/devel/setup.bash

rosrun ros\_opency camera publisher.py

In the third terminal, start the subscriber node

source/ros\_open\_cv\_ws/devel/setup.bash

rosrun ros opency camera\_subscriber.py